

WHAT IS CLAIMED IS:

1. A composition for treating stainless steel parts at temperatures between 750°F and 950°F comprising alkali metal cyanates and alkali carbonate and wherein said cyanate ion is present in a weight percentage of greater than 45% and less than 55.2%.

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2. The invention as defined in claim 1 wherein said cyanate ion is present in a weight percentage of greater than 45% and less than 50%.

10 3. The invention as defined in claim 1 wherein said cyanate ion is present in weight percentage of about 48%.

4. The invention as defined in claim 1 wherein said alkali metal is selected from the group of sodium, potassium, and mixtures thereof.

15 5. The invention as defined in claim 1 wherein said alkali metal is a mixture of sodium and potassium.

6. The invention as defined in claim 5 wherein the ratio of potassium to sodium is about 3.9 to 1.0.

20 7. A method for producing a nitride or a hard case on a stainless steel workpiece comprising the steps of:

providing a fused bath of alkali metal cyanate, and alkali metal carbonate, wherein said cyanate ion is present in a weight percentage of greater than 45% and less than 55.2%, maintained at a temperature of between 750°F and 950°F, and immersing a workpiece in said bath for a sufficient time to form a hard case thereon.

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8. The invention as defined in claim 7 wherein said cyanate ion is present in a weight percentage of between 48% and 50%.

9. The invention as defined in claim 7 wherein said cyanate ion is present in a weight percentage of about 48%.

10 10. The invention as defined in claim 7 wherein said alkali metal is selected from the group of sodium, potassium, and mixtures thereof.

15 11. The invention as defined in claim 7 wherein said alkali metal is a mixture of sodium and potassium.

12. The invention as defined in claim 11 wherein the ratio of potassium to sodium is about 3.9 to 1.0.

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13. The invention as defined in claim 7 wherein said workpiece is stainless steel.

14. The invention as defined in claim 13 wherein said workpiece is austenitic stainless steel.

15. The invention as defined in claim 14 wherein said workpiece is immersed in
5 said bath for at least four hours at a temperature of between 750°F and 850°F .

16. The invention as defined in claim 15 wherein the temperature is between about 750°F and 815°F and the workpiece is 304 stainless steel.

17. The invention as defined in claim 13 wherein the workpiece is hardenable
10 stainless steel and the temperature is about 950°F.